

CLAIMS

1. An illumination system comprising at least two light sources (10.1-11.1 and 10.2-11.2) emitting  
5 noncollinear and noncollimated light beams (12.1, 12.2), an optical component for combining and integrating said beams, which is placed in the path of said beams, comprising, from the upstream end of said paths to the downstream end:

10 - upstream, at least one prism (20) bounded by at least first and second entrance faces (20.1, 20.2) that form a dihedron, at least one of the entrance faces (20.1, 20.2) receiving one of said beams, which penetrates the prism and is then at least partly  
15 reflected by internal reflection on another of said entrance faces; and

- downstream, a light integrator (30) comprising a cylindrical rod made of transparent material, which receives at one end, called the entrance end, said  
20 beams reflected by at least one prism (20), the length of the rod being such that the light of said beams is reflected several times on the inside walls (30.1) of said rod so as to deliver at the other end, called the exit end, an almost uniform illumination beam (40),  
25 characterized in that each beam from all of the sources penetrates each prism.

2. The illumination system as claimed in claim 1, characterized in that the arrangement of said sources  
30 and the geometry and material of at least one prism are adapted so that the average directions of the various beams reflected by at least one prism (20) are approximately parallel to one another and parallel to the axis of the cylinder of the rod of the integrator  
35 (30).

3. The illumination system as claimed in either of claims 1 and 2, characterized in that it includes at least three light sources.

4. The illumination system as claimed in any one of the preceding claims, characterized in that said optical component comprises, upstream, only a single prism.

5. The illumination system as claimed in any one of the preceding claims, characterized in that the first and second entrance faces (20.1, 20.2) of at least one prism make an angle of approximately 60 degrees between them and in that the bisector plane of these two faces is parallel to the axis of the cylinder of the rod of the integrator (30).

6. The illumination system as claimed in any one of the preceding claims, characterized in that each beam (12.1, 12.2) converges substantially on the entrance end of the integrator.

7. An illumination system comprising at least two light sources (10.1-11.1 and 10.2-11.2) emitting noncollinear and noncollimated light beams (12.1, 12.2), an optical component placed in the path of said beams comprising, from the upstream end of said paths to the downstream end:

- upstream, at least one prism (20) bounded by at least first and second entrance faces (20.1, 20.2) that form a dihedron and by an exit face (20.3), each beam penetrating the prism via one of said entrance faces (20.1, 20.2) and being at least partly reflected by internal reflection on the other of said entrance faces; and

- downstream, a light integrator (30) comprising a transparent cylindrical rod that receives at one end, called the entrance end, said beams reflected by at least one prism (20), the length of the rod being such that the light of said beams is reflected several times on the inside walls (30.1) of said rod so as to deliver at the other end, called the exit end, an almost

uniform illumination beam (40), characterized in that  
said optical component comprises, upstream, two prisms  
(21.1, 21.2) having right-angled triangular cross  
sections, a first face determining the right angle of  
5 each prism being cemented to the entrance end of the  
integrator (30), and the second faces determining the  
right angle of each prism enclosing a beam splitter  
(22).

10 8. A projection or backprojection apparatus applying  
the illumination system as claimed in one of the  
preceding claims, characterized in that it includes a  
spatial light modulator illuminated by the light  
transmitted via the exit end (20.3) of the integrator.

15 9. The projection or backprojection apparatus as  
claimed in claim 8, characterized in that the spatial  
light modulator comprises a liquid-crystal cell.